

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. R2-2002-0060

FINAL SITE CLEANUP REQUIREMENTS AND RESCISSION OF ORDER NO. 98-066 FOR:

FMC CORPORATION

for the property located at

8787 ENTERPRISE DRIVE
NEWARK
ALAMEDA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter Board), finds that:

1. **Site Location:** The FMC Corporation (FMC) site is located at 8787 Enterprise Drive, Newark, Alameda County, west of Interstate 880 (I-880), south of Highway 84 and Dumbarton Bridge, and east of Highway 101. Land use in the vicinity of the site is largely industrial/commercial with several chemical processing/manufacturing facilities located nearby to the south and southeast, however, there are also residential developments within 500 feet of the site to the northeast. Undeveloped land adjacent and/or near the site includes: the former and active salt evaporation ponds that are adjacent to the San Francisco Bay and an engineered barge canal connected to the Newark Slough to the west; undeveloped land owned by Cargill, Inc., Salt Division to the south, and a Wildlife Refuge to the northwest. Figure 1 is a Site Location map and Figure 2 is a Site Plan.

The Site consists of eight parcels identified as Parcels A, B, C, D, E, F, G and I. Historical chemical operations occurred at five Parcels (A, B, C, D, and I), comprising 39.3 acres of land, bounded by the Union Pacific Railroad to the north, Willow Street to the east, Enterprise Drive to the south, and the salt ponds to the west. A Hetch-Hetchy pipeline right-of-way passes through Parcels A and D of the site. FMC owns Parcels E, F, and G comprising 7.9 acres located to the south, north, and east of the site's easternmost boundary, and have remained undeveloped and not used for manufacturing.

2. **Site History:** From 1929 through 1995, FMC and predecessor companies manufactured chemicals, as described below, that resulted in adverse impacts to the soil and groundwater beneath the site.

Sierra Magnesite Company first began chemical production at the site in 1929. Bromine and ethylene dibromide (EDB) were made from seawater bittern (Parcels B & I), and quick lime was manufactured from oyster shells (Parcel C). The bromine towers were constructed on Parcel B in 1929 and the EDB plant was constructed at the same time (1929) on Parcel I, which had been leased from Leslie Salt Company. Sierra Magnesite became California Chemical Company in 1934. California Chemical Company merged into Westvaco Chlorine Products Corporation in 1937. A magnesia plant was constructed by Westvaco on Parcel C in 1937. In 1942, a pilot plant for a copper-based catalyst (1707 Catalyst) was built on Parcel I, which was leased from Leslie Salt Company, and a plant for the full production of the catalyst was constructed on Parcel A. These catalyst plants were closed in 1944. Westvaco Chlorine Products Corporation merged with Food Machinery Corporation in 1948 to form Food Machinery and Chemical Corporation (later shortened to FMC Corporation). A phosphate plant and phosphoric acid plant were constructed on Parcel A in 1950. Phosphoric acid was manufactured by burning elemental phosphorus (P_4) that was produced elsewhere and shipped to Newark by rail. Phosphate products were manufactured by processing phosphoric acid and sodium carbonate. The plant was subsequently retrofitted for purposes of manufacturing additional phosphate products using sodium and potassium hydroxide. Between 1955 and 1959, full scale manufacturing of the 1707 Catalyst was

performed at the location of the former pilot plant on Parcel I. The magnesia plant, bromine towers, and EDB plant were shutdown and the associated manufacturing facilities were removed in 1968. The lease with Leslie Salt Company for Parcel I was terminated, and Leslie Salt Company assumed management of this property. In that same year (1968), the magnesia plant (Parcel C) was also shutdown and equipment and all aboveground structures were removed or demolished. Footings and other below-grade concrete structures were left in place.

In the mid 1960s, a small catalyst plant was constructed on Parcel B for manufacture of a proprietary catalyst; this facility was shutdown in 1976. During that same year, a hydrogen peroxide (and other chemicals) distribution facility was constructed on Parcel B. FMC acquired the adjacent site (Parcel I where part of the former EDB plant was located) from Designed Building Systems, Inc. (DBS) on August 16, 1988. The phosphate plant and phosphoric acid plant were shutdown in 1994 and 1995, respectively. All former phosphate plant and phosphoric acid plant manufacturing facilities were removed by the end of 1996. The City and County of San Francisco maintains a right-of-way for the Hetch-Hetchy water pipeline that bisects the eastern portion of the site (Parcels A & D) from the southeast to the northwest and borders Parcel B to the north.

At present, FMC's operation at the site consists of a hydrogen peroxide transloading (transfer and loading) facility. Site operations also include the operation and maintenance of a groundwater remediation system (extraction from the Newark aquifer and the shallow groundwater zone, with treatment and discharge to the Union Sanitary District [USD]), and operation and maintenance of a groundwater monitoring system.

With the exception of the hydrogen peroxide transloading operations, all other facility operations have ceased. The five parcels previously used for manufacturing are discussed separately in this document since each parcel differs in historical chemical operations and each parcel may be redeveloped independently. The history of chemical use and manufacturing, processing, handling, storage, and research operations, as well as the documented chemical releases, summary of soil and groundwater investigations, interim remedial actions, and facility closures are detailed in the following documents:

- "Remedial Investigation Workplan (Volumes I through III)," dated September 25, 1998;
- "Remedial Investigation Report (Volumes I through III)," dated June 15, 1999;
- "Resource Conservation and Recovery Act Facility Assessment Document," October 10, 2000; and
- "Proposed Final Remedial Actions and Cleanup Standards," dated January 31, 2001.

3. **Named Dischargers:** FMC is named as a discharger based on past chemical use and activities, and its status as property owner at present and during the time of chemical release.

If additional information is submitted or otherwise becomes available indicating that other parties caused or permitted any waste to be discharged on the site or where it migrated to the site and such waste entered or could have entered waters of the state, the Board will consider adding those parties to this Order.

4. **Regulatory Status:** The site has been subject to the following Board orders:

- Order No. 85-113, Waste Discharge Requirements for: FMC Corporation and Designed Building Systems, Inc., Remedial Action Program, Newark, Alameda County, adopted September 18, 1985 (rescinded by Order No. 89-055);
- Order No. 87-049, Amendment to Waste Discharge Requirements, FMC Corporation and Designed Building Systems, Inc., Remedial Action Program, Newark, Alameda County, adopted May 20, 1987 (rescinded by Order No. 89-055);

- Order No. 89-055, Site Cleanup Requirements for: FMC Corporation Phosphorus Chemicals Division, 8787 Enterprise Drive, Newark, Alameda County, adopted April 19, 1989 (rescinded by Order No. 98-066);
- Order No. 92-048, Waste Discharge Requirements (National Pollutant Discharge Elimination System [NPDES] Permit No. CA0005177), adopted May 20, 1992 (expired without renewal May 20, 1997) and predecessor orders going back to 1976 adopting NPDES permits;
- WDID #2 01S011253, General NPDES Permit for Discharge of Storm Water Associated with Industrial Activity, Notice of Intent (NOI) submitted September 29, 1994 (Notice of Termination submitted on November 21, 1996); and
- Order No. 98-066, Revision of Site Cleanup Requirements and Rescission of Order No. 89-055 for: FMC Corporation, for the property located at 8787 Enterprise Drive, Newark, Alameda County, adopted July 15, 1998.

5. **Site Hydrogeology:** The site is located within the Niles Cone groundwater basin. The Newark Aquitard is the uppermost clay unit covering nearly all of the Niles subarea, and is underlain by the Newark aquifer, Centerville aquifer, Fremont aquifer, and the Deeper aquifers. Each of these aquifers is separated by an extensive clay aquitard. The Newark Aquifer is the uppermost aquifer within the Niles subarea and ranges between 45 to 60 feet below ground surface (bgs). Lithologically, the site is characterized by a thin layer of fill materials 0 to 5 feet bgs. Below the fill layer, a predominantly silty clay layer is encountered that extends, on average, to 10 feet bgs. This silty clay layer is underlain by a layer of fine-grained sand, silt and clay. This layer extends to about 18 to 20 feet bgs and is generally wet to saturated, especially at lower depths. This layer has been termed the shallow zone. Groundwater levels in the shallow zone beneath the site vary from 2 to 10 feet bgs. The shallow zone is underlain by blue-gray, clayey silt, and clay deposits that extend to a depth of approximately 45 feet bgs. This clay sequence, which averages 25 feet in thickness, separates the shallow zone from the deeper Newark aquifer. A 5 to 7 feet thick stiff, wet, blue-gray, clayey silt occurs at depths of approximately 20-25 feet bgs and acts as the principal barrier to downward migration of chemicals. The Newark aquifer is approximately 10 to 35 feet thick beneath the site, and is encountered at depths ranging from 45 to 55 feet bgs. An isolated bedrock outcrop of serpentine occurs near the southwestern corner of the site and acts as a barrier to groundwater movement in the Shallow Zone and the underlying Newark Aquifer. In both groundwater zones, the northwesterly groundwater flow direction is deflected to the north in the southwestern corner of the site. Historically, dating back to the 1940's through 1972, groundwater in the Newark Aquifer was below sea level with an eastward flow direction (reversal from its current flow direction) in the inland areas of the basin, due to excessive agricultural pumping. Topographically, the site is relatively flat with an elevation of approximately 11 feet above mean sea level (MSL).

The nearest surface water bodies to the FMC site are the Newark Slough located approximately 2000 feet north of the site, and Plummer Creek located approximately 2,500 feet south of the site. Plummer Creek is a tidal tributary of South San Francisco Bay and drains into the Newark Slough.

6. **Remedial Investigation:** The discharger initiated investigations to characterize soil and groundwater conditions at the site in 1980. Numerous additional soil and groundwater investigations variously occurred through 1998. The most recent remedial investigation was completed in accordance with Task B.2. of Board Order No. 98-066. Comprehensive results of that and all other investigations were submitted to the Board in the June 15, 1999, "Remedial Investigation Report." The Board accepted the report in September 1999, provided an addendum report was submitted documenting the results of the additional groundwater investigations that were performed north of Parcel A. These results were submitted in the December 9, 1999, "Remedial Investigation Addendum Report," accepted by the Board in April 2000. The lateral and vertical extent of site contamination has been adequately defined. Comprehensive results from all investigations are discussed below.

Parcels A & D: Formerly contained the former Phosphate and Phosphoric Acid Plants, Phossy Pond, 1707 Catalyst Plant, Stormwater Pond, Tetrapotassium Pyrophosphate (TKPP) Pond, and Filter Aid Pit

Soil investigations have confirmed that the soil in Parcel A has been adversely impacted with elemental phosphorous (P_4), but the extent has been delineated. Additionally, there are elevated metals concentrations in Parcels A & D, but the distribution is reportedly not widespread and no metals exceeded their respective United States Environmental Protection Agency (USEPA) Preliminary Remediation Goals (PRGs) for industrial soils. Arsenic was detected in one soil boring (MH-22) located in the area of the former filter aid pit at a concentration of 210 milligrams per kilogram (mg/kg) at 5 feet bgs. Recent sampling has confirmed that this sample represents a "hot spot," limited in areal extent and depth. Sampling performed at the request of the Newark Fire Department (NFD) did not reveal metals in soils in the former phossy pond area or along the former underground pipeline that ran from the former phosphoric acid plant to the phossy pond, at or above their respective USEPA PRGs (industrial soil).

The groundwater in Parcels A & D is monitored using seven wells (W-8 through W-13, W-15 & W-16) in the shallow zone and one well (DW-11) in the deeper Newark Aquifer zone. Arsenic, barium, chromium, lead, and nickel have been detected in the shallow zone groundwater in Parcel A at concentrations exceeding the State of California, Environmental Protection Agency (CAL EPA) Maximum Contaminant Levels (MCLs). P_4 was not detected in monitoring wells sampled in the shallow groundwater and Newark Aquifer at Parcel A, however, several volatile organic compounds (VOCs) have been detected in the shallow zone groundwater in Parcels A & D, the most notable to be 1,2-dichloroethane (1,2-DCA) which has also been detected in the Newark aquifer well DW-11 at concentrations exceeding the MCL. Other VOCs detected above MCLs in the shallow zone groundwater at Parcel A include: 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), 1,2-dichloropropane (1,2-DCP), tetrachloroethene (PCE), and trichloroethene (TCE).

Parcels B & I: Formerly contained the EDB Plant and bromine towers, catalyst pilot plants (Petro-Tex and 1707), magnesia research pilot plant, soda ash transloading area, effluent E-1 pond, product quality control laboratory, above-ground storage tank (AST) area for storage of solvents, gasoline, diesel, waste oil, fuel oil, 90-day hazardous waste storage area, hydrogen peroxide transloading and repair garage/paint shed.

Soil investigations have confirmed that the soil has been impacted by ethylene dibromide (EDB) and 1,2-DCA, with other VOCs and TPH to a lesser extent in Parcels B & I. The EDB in soil has been well defined and the 1,2-DCA is limited in extent within the vadose zone (unsaturated soil overlying the water table). Metals were not detected in the soil of Parcels B & I at levels exceeding their respective USEPA PRGs for industrial soils. Motor oil was present in soils at concentrations up to 2,700 mg/kg.

The shallow zone groundwater in Parcels B & I has been impacted by EDB, 1,2-DCA, trihalomethanes (bromoform, bromodichloromethane, dibromomethane, dibromochloromethane), and other VOCs to a lesser extent. The majority of 1,2-DCA at the site is present in the shallow zone in Parcels B & I. Trihalomethanes have been detected at concentrations exceeding the MCLs in 13 shallow zone wells in these parcels. The EDB-capped area contains the highest levels of these contaminants found at the site. As of January 2001, maximum concentrations of EDB (5,800,000 $\mu\text{g/l}$), 1,2-DCA (1,400,000 $\mu\text{g/l}$), bromoform (3,300,000 $\mu\text{g/l}$), and dibromochloromethane (280,000 $\mu\text{g/l}$) were detected in Well W-23. Other chlorinated VOCs detected above MCLs in the shallow zone beneath these parcels include 1,2-DCP, carbon tetrachloride, cis-1,2-DCE, TCE, and vinyl chloride. Metals (arsenic, chromium, nickel, lead and

selenium) were also detected above MCLs in the shallow groundwater in Parcels B & I. A groundwater extraction system is containing the EDB plume and capturing the compounds present in the shallow zone in Parcels B & I.

The Newark Aquifer has also been impacted by 1,2-DCA and EDB, with trihalomethanes, other VOCs, and metals (arsenic and selenium) to a lesser extent. 1,2-DCA has been detected in five Newark Aquifer monitoring wells at levels exceeding its MCL. As of January 2001, 1,2-DCA and EDB were detected in Well DW-2 at concentrations of 2,300 µg/l and 74 µg/l, respectively. In the Newark Aquifer, 1,2-DCA appears more pervasive, being detected at higher concentrations and in more wells than EDB, however, the extraction system has contained these compounds and concentrations have generally decreased over time in this aquifer. The data indicates that the EDB and 1,2-DCA concentrations are highest at the FMC site in comparison to several offsite properties currently under Board Orders. The presence of selenium in shallow zone groundwater and the Newark Aquifer may be due to natural occurrences.

The absence of significant concentrations of VOCs within the Irvington aquitard directly beneath the center of the EDB area demonstrates that significant vertical migration from the Newark Aquifer to the underlying aquifer has not occurred. TPH has not been detected in the shallow zone or Newark Aquifer groundwater in these parcels.

Parcel C: Formerly contained the magnesia plants including the concrete pits used to house machinery, and the bunker fuel oil AST area.

Investigations performed in Parcel C have concluded that the primary pollutants to soil and groundwater in this parcel are associated with releases from the two former 100,000-gallon Bunker C fuel oil storage tanks. Magnesia was manufactured on this parcel, but was not found to be a pollutant in the soil and groundwater at the site. Petroleum hydrocarbon-impacted soil was delineated and although various petroleum hydrocarbon constituents have been detected in the groundwater from the monitoring wells, no benzene, toluene, ethylbenzene or xylenes (BTEX), or polycyclic aromatic hydrocarbons (PAHs) have been detected in these wells.

7. **Adjacent Sites:** There are four neighboring sites located east/southeast of the FMC site that have also polluted soil and groundwater and are currently conducting groundwater investigation and cleanup under Board jurisdiction. These sites include: Ashland Chemical Company, 8610 Enterprise Drive; former Foster/Romic property, 37445 Willow Street; Jones-Hamilton Chemical Company, 8400 Enterprise Drive; and former Baron-Blakeslee, 8333 Enterprise Drive and are shown on Figure 3. Contaminants from an upgradient offsite source or sources likely migrated in the groundwater to FMC's undeveloped Parcels E, F and G. However, the source or sources has not been identified, and the natural flow of groundwater has been altered in this area due to historic (1940 to 1972) overpumping for irrigation and agricultural use, and also the groundwater cleanups occurring for the past 20 years at FMC and neighboring sites mentioned above.
8. **Interim Remedial Measures:** The discharger has implemented remedial measures in accordance with Waste Discharge Requirements Order No. 85-113, Amendment to Waste Discharge Requirements Order No. 87-049, and Site Cleanup Requirements Order No. 89-055. In late 1985 and early 1986, the discharger constructed an asphalt cap with perimeter concrete ditches to prevent the direct infiltration of precipitation into the EDB area to minimize the possibility of leaching into the shallow zone groundwater, to prevent direct exposure to EDB-impacted soils and reduce the migration of vapors that may originate from the soil and shallow groundwater, and prevent surface water from coming into contact with EDB-impacted soils. In accordance with the provisions of Board Order No. 85-113, the Newark aquifer extraction system was constructed and began operation in January 1986, and has primarily consisted of two extraction wells, DW-2 and DW-8. Groundwater has been extracted from wells DW-2 and DW-8 and transferred directly to the treatment system via individual pipelines.

The shallow zone extraction and containment system was constructed and began operation in 1989 under Board Order No. 87-49 to create a barrier to the lateral migration of EDB downgradient to the north and east in the shallow zone. Following modifications that were documented to and approved by the Board, the current shallow zone extraction and containment system includes 17 extraction wells aligned along the northern and eastern boundaries of the capped area. Since October 1988, the discharger has been discharging the treated groundwater into the USD sewer system under the USD permit limitations and reporting requirements.

Since 1989, the discharger has performed evaluations of treatment system effectiveness and has provided results to the Board on an annual basis. Localized groundwater depressions are evident in the EDB area within the shallow zone as a result of groundwater extraction. Concentration reductions of EDB and 1,2-DCA have occurred in the shallow zone during the past ten years in the capped area. The most significant reductions have occurred in the periphery of the EDB plume, demonstrating that the shallow zone extraction system has been effective in containing the EDB and 1,2-DCA plumes.

A cone of depression also exists around Newark aquifer extraction wells DW-2 and DW-8 and the EDB and 1,2-DCA plumes are being captured by extraction from these wells. Additionally, groundwater contaminants present beneath the facilities located immediately upgradient of the site will also be captured by the discharger's extraction system. The trend for extraction wells DW-2 and DW-8, and the Newark aquifer monitoring wells indicates a decreasing trend of EDB and 1,2-DCA.

In addition, the discharger performed numerous closure activities at the site, as summarized below:

Closures Performed at Parcels A & D

The following closures were conducted under the direction of the NFD:

- Phosphorus storage pit closure – 1993/1994;
- Hazardous materials storage tanks, phosphoric acid plant and phosphate plant area – 1995/1996;
- Former phosphoric acid plant elevator – 1995/1996;
- Final phosphoric acid plant closure activities – 1995/1996; and
- Removal of an approximate 1,000-gallon gasoline underground storage tank (UST) - 1986.

A Closure Certification Report was submitted to the NFD on April 10, 1998, summarizing closure activities and reports for the former phosphoric acid plant and phosphate plant. During April through June 2001, with notification to the NFD, FMC removed all the below-grade concrete structures from the former phosphoric acid plant area at Parcel A with the exception of the former phosphorus storage pits. During these removal activities, a total of approximately 65 tons of petroleum hydrocarbon-impacted soil and 13,600 gallons of petroleum hydrocarbon-impacted groundwater was removed and disposed in accordance with applicable regulations. FMC also removed all below-grade concrete structures from the former phosphate plant area at Parcel A in October and November 2001.

FMC closed the former phossy water pond in 1985/1986 under the direction of the Department of Health Services (DHS), acknowledged by their letter dated January 29, 1987.

The former stormwater pond was closed in 1987 by excavation and off-site disposal, with excavated soils manifested as a hazardous waste due to high arsenic concentrations. Prior to closure, confirmatory soil samples of sludge and underlying soil from the pond were obtained (1985/1986) and analyzed. The area was subsequently backfilled. After closure of the pond, stormwater runoff was collected in a 200,000-gallon aboveground storage tank (AST) located near the former pond. The 200,000-gallon tank was closed in 1995 under the authority of the NFD.

The former tetrapotassium pyrophosphate (TKPP) pond was closed in 1983 pursuant to notifications to the Board and DHS by excavation and off-site disposal, and the area was backfilled. The DHS approved the closure of the TKPP pond in a letter dated April 12, 1984.

The former filter aid pit, and approximately 700-800 feet of the former E-1 ditch were closed by excavation and off-site disposal in 1972. The excavated areas were backfilled with clean fill and graded.

Closures Performed at Parcels B & I included the following:

- A small underground gasoline storage tank was removed from the west side of the garage in 1986 in accordance with NFD requirements and oversight.
- The former effluent (E-1) pond was taken out of service and backfilled with clean fill in mid-1996.
- Five ASTs used to store diesel and Stoddard solvent were removed from Parcel B in December 1998, under the oversight of the NFD, as documented in their letter dated May 5, 1999.
- Two hydraulic hoists were removed from the former rolling equipment repair garage area (one within the garage and one behind) from March 29 through April 7, 2000, under the authority of the NFD.

Closures Performed at Parcel C

In November 1998, concrete demolition and removal activities were initiated in the area of the former magnesia plant to remove below grade concrete foundations and rubble that were left in place after the plant was decommissioned and aboveground structures dismantled or demolished in 1968. The remnants of two former Bunker C fuel storage tanks were discovered during grading activities. Only the bottoms of the tanks and approximately three vertical feet of tank walls remained intact, buried below fill material. Soil saturated with product was observed in and around the tank remnants. In accordance with NFD closure requirements and approved Closure Plan dated April 20, 1999, the remnants of the two tanks were removed, the impacted soil was excavated and disposed, and the area was backfilled. Approximately 4,000 tons of soil were removed and disposed of at Altamont Landfill in Livermore, California, under non-hazardous waste manifests. NFD personnel performed inspections during the course of the tank closure process. A Closure Certification Report was issued by Decon Environmental Services (Decon) on October 25, 1999. On December 7, 1999, the NFD issued a letter stating that all closure requirements had been met. In addition, during 1998/1999, approximately 12,000 tons of magnesia material was removed and properly disposed of at an off-site facility.

9. **Risk Assessment:** The "Proposed Final Remedial Actions and Cleanup Standards" report included a "Human Health and Screening Ecological Risk Assessment Report" dated January 30, 2001, for the site. The purpose of the risk assessment was to determine whether present site conditions pose a potential health hazard to current and future site users, and if necessary, to calculate site specific target levels (SSTLs) for chemicals of interest (COIs) in soil and shallow zone groundwater. In addition, potential impacts on ecological receptors from affected shallow zone and Newark aquifer groundwater and site soil were qualitatively evaluated. The comprehensive risk assessment augmented prior health risk assessment reports prepared in 1985 and 1986, and addressed the entire site by utilizing all available data including the information collected during the 1999 remedial investigation. The risk assessment considered the present site worker conditions (current outdoor worker) and future worker conditions based on the "Administrative Specific Plan for Area 2 in Newark" (future outdoor commercial worker, future indoor commercial worker, future service worker, future construction worker, and post-remediation future construction worker). The Board considers the following human

health risk to be acceptable at remediation sites: a hazard index of 1.0 or less for non-carcinogens and an excess cancer risk of 10^{-4} to 10^{-6} or less for carcinogens.

The risk assessment separately evaluated each of the site's five parcels used previously for manufacturing since each differed in historical chemical operations and may be redeveloped independently. The results for certain parcels indicate current soil and groundwater contamination will cause excessive human health risks for current and future site users, and that active remediation and institutional controls are needed. The proposed remediation and institutional controls will bring human health risks down to acceptable levels, if implemented effectively to achieve the required cleanup goals.

COIs were selected in each parcel for soil and groundwater following conservative and regulatory agency-accepted screening procedures. Depending on the parcel, VOCs, some limited inorganic compounds, and total petroleum hydrocarbons (TPH) were identified as COIs in soil and shallow-zone groundwater at the site.

Although EDB, 1,2-DCA, and arsenic have been detected in some Newark Aquifer wells, no COIs were selected in the Newark Aquifer because the risk assessment identified no complete exposure pathways associated with this aquifer. This finding was based on the assumption that high total dissolved solids [TDS] and chloride concentrations render the water unsuitable for potable use. However, with reference to ACWD's brackish water desalination facility (see Section 13), now under construction, use of the brackish water as a source of potable supply in the Niles Cone can no longer be considered unsuitable solely on the basis of chloride and TDS levels. In addition, ACWD has been considering operating nearby extraction wells for purposes of accelerating reductions of chlorides and TDS in inland areas of the Newark Aquifer, although a final determination of whether or not to do so has not yet been made. Accordingly, contamination of the Newark Aquifer (and shallow zone) beneath FMC remains a concern. Therefore, a risk assessment, specific to the threat to nearby ACWD wells, must be undertaken should ACWD decide to operate them for potable use, aquifer restoration, or other purposes. In the interim, the residual levels of EDB, 1,2-DCA, and arsenic in the Newark aquifer will continue to be managed by demonstrating the lack of plume migration through the hydraulic control of the existing groundwater extraction and treatment system.

The risk assessment concluded the following:

Parcel A

The presence of residual P_4 detected in soils beneath Parcel A poses an unacceptable risk for current and future land use. Therefore, for protection of human health from P_4 exposure, FMC proposes to prevent human exposure to the combustion that occurs when P_4 contacts the atmosphere and to minimize the potential for transport of P_4 in groundwater by capping the P_4 -containing area and implementing a Risk Management Plan that will provide for acceptable human health risk to current or future workers.

In addition to P_4 , cadmium, molybdenum, and nickel were identified by FMC as COIs in soil, however, these compounds were present at levels that are acceptable with respect to human health risk to current or future worker scenarios evaluated in the assessment. Likewise, various VOCs, arsenic, and nickel were identified as COIs in shallow zone groundwater beneath Parcel A, however, these compounds were also found to be at acceptable levels (excluding consideration of groundwater beneficial use criteria).

Parcels B & I

EDB, 1,2-DCA, metals (chromium and nickel), and TPH were identified by FMC as COIs in soil in Parcels B & I. In addition, various VOCs, including EDB, along with arsenic, chromium, and nickel were identified as COIs in shallow zone groundwater beneath these parcels. The presence of elevated levels of EDB and 1,2-DCA in soil and EDB in shallow zone groundwater poses an unacceptable cancer risk and non cancer health hazard for future outdoor and indoor workers, and future service and

construction workers, primarily associated with inhalation of EDB and 1,2-DCA vapors. FMC developed SSTLs for EDB and 1,2-DCA in soil and for EDB in shallow zone groundwater. EDB contributes more than 95% to the overall shallow zone groundwater risk and hazard index value. A cleanup plan has been developed to: (1) address the excessive risk posed by EDB and 1,2-DCA at the site; (2) mitigate the EDB and 1,2-DCA pollution in the soil and ground water at the site; and (3) result in an acceptable risk to human health (excluding consideration of groundwater water beneficial use criteria) once the proposed cleanup goals in the Plan have been met.

With regard to the TPH as motor oil that was identified by FMC as a COI in Parcels B and I soils, no individual TPH constituents (BTEX or PAHs) were detected at concentrations above health based screening levels (residential PRGs). In addition, the 95% upper confidence limit (UCL) concentration of TPH as motor oil of 311 mg/kg is below 1,000 mg/kg TPH screening concentration. Residual TPH concentrations in this area will be managed through the implementation of a Risk Management Plan.

Parcel C

With the exception of TPH, no COIs were identified by FMC for the soil and shallow zone groundwater in Parcel C.

No individual TPH constituents (i.e., BTEX or PAHs) were detected in soil beneath Parcel C at concentrations above health based screening levels (residential PRGs). Both the 95% UCL concentration of TPH as motor oil and the maximum concentration of TPH as diesel are below 1,000 mg/kg. TPH as motor oil has also been detected in shallow zone groundwater. The TPH is associated with two tanks and approximately 4,000 tons of affected soil that have been removed, and periodic collection of groundwater samples from nearby monitoring wells (W-1, W-2, and W-3) confirm the lack of plume migration.

Parcel D

FMC identified arsenic as a COI for soil, and arsenic and 1,2-DCA as COIs for the shallow zone groundwater beneath Parcel D. A quantitative evaluation of the arsenic soil concentrations was not conducted by FMC since arsenic concentrations site-wide and 95% UCL in Parcel D were considered indicative of regional background concentrations. An elevated concentration of 210 mg/kg was detected in Parcel D at a location of the former E-1 ditch ("downstream" of the former filter aid pit). Arsenic was detected at low concentrations (below background) in all samples collected from the former pit. Removal of this arsenic hot spot will be performed as addressed within the "Proposed Final Remedial Actions and Cleanup Standards Report."

With regard to the 1,2-DCA and arsenic in shallow zone groundwater, exposure to the detected chemicals in soil and shallow zone groundwater do not pose a human health risk to current or future worker scenarios evaluated in the assessment.

Ecological Assessment

Chemicals of interest at the site are limited to VOCs, TPH, and some metals in soil and shallow zone groundwater, and P₄ in soil. Remedial actions that have been implemented at the site, including capping the EDB impacted area in Parcels B and I and the installation of a groundwater extraction and treatment system, have minimized any potential for migration of contaminated groundwater to surface water. Although the surrounding environs do provide habitat for fish and wildlife use, there are currently no potentially complete exposure pathways by which off-site ecological receptors could be affected by on-site chemicals. Since groundwater extraction and treatment are expected to continue during redevelopment of the various site parcels, affected groundwater will continue to be contained and potential ecological impacts mitigated.

10. **Feasibility Study:** The discharger has submitted a "Proposed Final Remedial Actions and Cleanup Standards" report (RAP), dated January 30, 2001. The RAP presented the results of the remedial investigation, evaluated the interim remedial measures, presented a risk assessment and proposed cleanup standards, identified and screened potential remedial alternatives, recommended final remedial actions, and presented a task list and schedule to implement the recommended remedial actions. The Board conditionally accepted the RAP, including the "Human and Screening Ecological Risk Assessment Report" (risk assessment) in a letter dated September 13, 2001. The condition requires determining a Site-Specific Target Level (SSTL) for 1,2-DCA in shallow zone groundwater if FMC decides to terminate active remediation of groundwater prior to meeting groundwater cleanup standards (MCLs) for 1,2-DCA.

Using the guidance by the USEPA under the CERCLA National Contingency Plan, the feasibility study was performed to screen, evaluate, and select the most appropriate remedial technologies for soil, the shallow zone, and the Newark aquifer. Considering site-specific conditions and risk assessment results, the remediation target zones for soil, shallow zone, and Newark aquifer were identified. General response actions considered in the feasibility study included no action, no active response (institutional controls, groundwater monitoring), containment, in-situ remediation, and removal/treatment or disposal. Applicable remedial technologies and process options were considered, evaluated, and screened based on implementability, effectiveness, and order of magnitude cost. The selected remedial technologies for soil, the shallow zone, and the Newark aquifer were combined to provide four alternatives for detailed evaluation. The alternatives were as follows: 1) No Action; 2) Monitored Natural Attenuation; 3) Capping and Migration Control; and 4) Capping, Migration Control, and Enhanced Removal. Based on an evaluation using the nine criteria proposed by USEPA and future redevelopment of the site, alternative 4 was selected for implementation.

Alternative 4 includes capping the P₄-containing area, implementing dual-phase extraction (DPE) with steam injection to remediate soil and shallow zone groundwater that contains greater than SSTLs of EDB and 1,2-DCA, groundwater extraction from the shallow zone and Newark aquifer, and groundwater/treatment system monitoring. Alternative 4 also includes soil excavation at the location of MH-22 in Parcel D (elevated levels of arsenic) and implementation of institutional controls.

Implementation of DPE with steam injection is intended to remove the source of VOCs from the soil and shallow zone groundwater. Upon source removal, the effects of natural attenuation will be evaluated. The findings of the evaluation will be used to assess the need for further monitoring or termination of the groundwater remediation system.

11. **Cleanup Plan:**

Parcel A: The final remedial action for soil impacted with P₄ (Parcel A) is an engineered cap. No further action is required for P₄ in groundwater.

Parcel B & I: The final remedial action for soil and shallow zone groundwater impacted with VOCs (Parcels B & I) is steam-enhanced dual phase extraction and continuation of the current shallow zone and Newark aquifer groundwater extraction system. As of March 2002 there were 17 shallow zone and two Newark Aquifer groundwater extraction wells at the site.

Parcel C: No further action is required for TPH in soils and groundwater (Parcel C). Groundwater wells in Parcel C will be monitored semi-annually for TPH in shallow zone groundwater.

Parcel D: The final remedial action for isolated soil impacted with arsenic (Parcel D) is excavation and removal.

Elements Common to All Parcels:

With respect to metals in shallow zone groundwater, the final remedial action is continued monitoring. Monitoring is an integral component of the cleanup plan and will be performed in accordance with the Self-Monitoring Program attached to this Order. A Risk Management Plan (RMP) will be implemented at the site.

12. **Risk Management Plan:** FMC proposes to mitigate risks associated with residual chemicals in soil and groundwater at the site by implementing a Risk Management Plan (RMP) for the entire site. FMC submitted a RMP on December 20, 2001. The RMP addresses risk management and control during current conditions, future development, and completion of final remedial actions. Under current conditions, risk management/control measures include restricting unauthorized access, providing guidance to limit disturbance of the EDB cap and soil in the P₄-impacted area, and establishing health and safety protocols for consultants and contractors. After completion of final remedial actions, risk control measures will address any work performed during site development or after construction. A recorded deed restriction prohibiting the excavation of soils containing P₄ and prohibiting the use of shallow zone groundwater and Newark aquifer groundwater as a source of drinking water and prohibiting residential uses will be required. Also, area-specific health and safety plans will be developed to address potential exposure to residual chemicals in soil and specifically dust control, dewatering, equipment decontamination, surface runoff, and excavation/loading/transport of any contaminated soil and water.
13. **Groundwater Management:** The ACWD manages groundwater resources in the Newark, Union City, and Fremont area. On average, 35% of the residents' water supply comes from groundwater, mostly from well fields located about 5 miles east of the site. ACWD's management activities address saltwater intrusion caused by past overdrafting of the Newark Aquifer and deeper aquifers. ACWD has reversed the overdrafting by constructing artificial recharge facilities and augmenting natural Alameda Creek base flow with imported water for groundwater recharge. In addition, ACWD operates several extraction wells to remove high salinity groundwater from the Newark Aquifer and deeper aquifers within the Niles Cone (Aquifer Reclamation Program or ARP). Beginning in 2003, ACWD will treat a portion of its ARP pumpage for potable use with a desalination facility (currently under construction) at a location that is about 1.5 miles southeast of the FMC site. ARP wells that will initially feed raw water to the desalination facility are located approximately 2 miles from FMC. Hence the nearest municipal potable water well will be 2 miles from FMC in 2003.

In addition to the ARP wells, ACWD initiated in the 1970's construction of an alignment of Newark Aquifer extraction wells located just inland of the salt evaporator ponds along San Francisco Bay. The barrier had been planned to extend over the entire coastal length of the Niles Cone in a general north-south direction. ACWD completed construction of five wells, including one (Site C) within 1,500 feet of the site. These wells, referred to as Salinity Barrier Project (SBP) wells, originally were envisioned to serve two functions: (i) prevent new saltwater intrusion during drought periods (when the Newark Aquifer head could drop below sea level) and (ii) hasten the removal of existing saline groundwater in the Newark Aquifer east of the SBP wells. However, under revised water management plans, ACWD does not anticipate operating these wells as a barrier curtain during droughts. Instead, these wells would more likely be operated to fulfill the second of the two objectives noted above, effectively serving as ARP wells. As part of an ongoing re-evaluation of overall project feasibility, ACWD has been reviewing operating criteria and whether or not original plans for construction of additional SBP wells should be carried out. One well, Site B, located about 1.5 miles from the FMC site, is also being evaluated as a supply well for the desalination facility.

Chloride concentrations beneath the site in the Newark aquifer range from 15,000 to 20,000 parts per million (ppm), mainly as a result of saltwater intrusion. The site is located west (or bayward) of the proposed SBP wells alignment. Chloride concentrations therefore may not decline significantly.

However, Implementing the SBP may accelerate the migration of VOCs in shallow groundwater, both laterally and vertically. If significant VOC concentrations migrate to the SBP wells, then ACWD may be required to treat SBP well pumpage prior to discharging it to surface waters or using it for beneficial use.

As ACWD plans are currently on hold, and the chemical composition of the groundwater at the SBP wells is not known, assessment of risk to the SBP wells is not warranted at this time. In the RAP acceptance letter dated September 13, 2001, the Board concurred that FMC need not evaluate the risk of groundwater plume migration from the site as a result of potential extraction of groundwater from the SBP wells. However, FMC must initiate the risk evaluation immediately after ACWD decides to proceed with operation of SBP well Site A, Site B, or Site C, or any future ACWD water well screened in the Newark Aquifer and located less than 2 miles from the FMC Site. FMC must not wait for commencement of operation but must initiate the risk evaluation immediately after ACWD decides to operate one or more of the wells noted above. In evaluating this risk, FMC will need to consider all chemicals of concern (including phosphates) that could interfere with the Alameda County Water District (ACWD) ability or authorization to use (e.g., as a supply to a desalinization plant) or dispose of the extracted groundwater, as applicable.

14. Basis for Cleanup Standards

- a. **General:** State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest level of water quality which is reasonable if background levels of water quality cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives. The previously-cited cleanup plan confirms the Board's initial conclusion that background levels of water quality cannot be restored. This order and its requirements are consistent with Resolution No. 68-16.

State Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304," applies to this discharge. This order and its requirements are consistent with the provisions of Resolution No. 92-49, as amended.

- b. **Beneficial Uses:** The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board and the Office of Administrative Law on July 20, 1995, and November 13, 1995, respectively. A summary of regulatory provisions is contained in Title 23, California Code of Regulations, Section 3912 (23 CCR 3912). The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters.

The potential beneficial uses of groundwater underlying and adjacent to the site include:

- i. Municipal and domestic water supply
- ii. Industrial process water supply
- iii. Industrial service water supply
- iv. Agricultural water supply
- v. Freshwater replenishment to surface waters.

At present, there is no known use of groundwater underlying the site for the above purposes.

The existing and potential beneficial uses of the Plummer Creek, a tidal tributary of South San Francisco Bay, include:

- i. Water contact and non-contact recreation
 - ii. Wildlife habitat
 - iii. Cold freshwater and warm freshwater habitat
 - iv. Fish migration and spawning
 - v. Estuarine habitat
- c. **Basis for Groundwater Cleanup Standards:** The groundwater cleanup standards for the site are based on applicable water quality objectives and are the more stringent of EPA and California primary maximum contaminant levels (MCLs). Cleanup to this level will result in acceptable residual risk to humans.
- d. **Basis for Soil Cleanup Standards:** The soil cleanup standards for the site are 1.1 mg/kg EDB, 6.5 mg/kg 1,2-DCA, 14 mg/kg arsenic, and 1,000 mg/kg TPH. Cleanup to this level is intended to prevent leaching of contaminants to groundwater and will result in acceptable risk to humans. The remediation goal for the P₄-impacted area is to prevent exposure to P₄ due to the overriding issue associated with combustion.
15. **Future Changes to Cleanup Standards:** The goal of this remedial action is to restore the beneficial uses of groundwater underlying and adjacent to the site. Results from other sites suggest that full restoration of beneficial uses to groundwater as a result of active remediation at this site may not be possible. If full restoration of beneficial uses is not technologically nor economically achievable within a reasonable period of time, then the discharger may request modification to the cleanup standards or establishment of a containment zone, a limited groundwater pollution zone where water quality objectives are exceeded. Conversely, if new technical information indicates that cleanup standards can be surpassed, the Board may decide that further cleanup actions should be taken.
16. **Reuse or Disposal of Extracted Groundwater:** Board Resolution No. 88-160 allows discharges of extracted, treated groundwater from site cleanups to surface waters only if it has been demonstrated that neither reclamation nor discharge to the sanitary sewer is technically and economically feasible.
17. **Basis for 13304 Order:** The discharger has caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of pollution or nuisance.
18. **Cost Recovery:** Pursuant to California Water Code Section 13304, the discharger is hereby notified that the Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this order.
19. **CEQA:** This action is an order to enforce the laws and regulations administered by the Board. As such, this action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321 of the Resources Agency Guidelines.
20. **Notification:** The Board has notified the discharger and all interested agencies and persons of its intent under California Water Code Section 13304 to prescribe site cleanup requirements for the discharge, and has provided them with an opportunity to submit their written comments.
21. **Public Hearing:** The Board, at a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the discharger (or its agents, successors, or assigns) shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous substances in a manner which will degrade water quality or adversely affect beneficial uses of waters of the State is prohibited.
2. Further significant migration of wastes or hazardous substances through subsurface transport to waters of the State is prohibited.
3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of wastes or hazardous substances are prohibited.

B. CLEANUP PLAN AND CLEANUP STANDARDS

1. **Implement Cleanup Plan:** The discharger shall implement the cleanup plan described in Finding 11.
2. **Groundwater Cleanup Standards:** The following cleanup standards shall be met in all groundwater monitoring wells identified in the Self-Monitoring Program:

Groundwater Cleanup Standards

Constituent	Standard (ug/l)	Basis
Ethylene Dibromide (EDB)	0.05	CAL EPA and USEPA Primary MCL
1,2-Dichloroethane (1,2-DCA)	0.5	CAL EPA Primary MCL
Bromoform	100 ¹	CAL EPA and USEPA Primary MCL
Trichloroethene (TCE)	5	CAL EPA and USEPA Primary MCL
Dibromochloromethane (DBCM)	100 ¹	CAL EPA and USEPA Primary MCL
1,1-Dichloroethane (1,1-DCA)	5	CAL EPA Primary MCL
1,1,1-Trichloroethane (1,1,1-TCA)	200	CAL EPA and USEPA Primary MCL
Tetrachloroethene (PCE)	5	CAL EPA and USEPA Primary MCL
cis-1,3-Dichloropropene	0.5	CAL EPA Primary MCL
1,1-Dichloroethene (1,1-DCE)	6	CAL EPA Primary MCL
Chloroform	100 ¹	CAL EPA and USEPA Primary MCL
Methylene Chloride	5	CAL EPA and USEPA Primary MCL
Chlorobenzene	70	CAL EPA Primary MCL
Vinyl Chloride	0.5	CAL EPA Primary MCL
1,2-Dichloropropane	5	CAL EPA and USEPA Primary MCL
Arsenic	50	CAL EPA and USEPA Primary MCL
Barium	1,000	CAL EPA Primary MCL
Chromium	50	CAL EPA Primary MCL
Nickel	100	CAL EPA Primary MCL
Lead	15	CAL EPA and USEPA Primary MCL
Selenium	50	CAL EPA and USEPA Primary MCL

¹ As total trihalomethanes (sum of bromoform, bromodichloromethane, chloroform, & dibromochloromethane).

3. **Soil Cleanup Standards:** The following cleanup standards shall be met for soil at the site:

Constituent	Standard (mg/kg)	Basis
Ethylene Dibromide (EDB)	1.1	Human Health Risk Assessment
1,2-Dichloroethane (1,2-DCA)	6.5	Human Health Risk Assessment
Arsenic	14	Human Health Risk Assessment
Total Petroleum Hydrocarbons (TPH) (as 95% UCL)	1,000	Human Health Risk Assessment

C. TASKS

1. WORKPLAN FOR IMPLEMENTATION OF FINAL REMEDIAL MEASURES

COMPLIANCE DATE:

May 31, 2002

Submit a workplan acceptable to the Executive Officer for the implementation of: a) a steam-enhanced, dual-phase extraction (DPE) system to remediate source-area soils and shallow groundwater containing elevated concentrations of EDB and 1,2-DCA; b) an engineered cap over isolated soils containing P_4 ; and c) isolated soil removal for elevated arsenic concentrations. The workplan shall describe all significant implementation steps and provide an implementation schedule.

2. PROPOSED INSTITUTIONAL CONSTRAINTS

COMPLIANCE DATE:

August 30, 2002

Submit a technical report acceptable to the Executive Officer documenting procedures to be used by the discharger, and future owners and associated occupants of the site, to prevent or minimize human exposure to soil and groundwater contamination prior to meeting cleanup standards. Such procedures shall include a deed restriction prohibiting the excavation of soils containing P_4 and prohibiting the use of shallow zone groundwater and Newark aquifer groundwater as a source of drinking water and prohibiting residential uses.

3. IMPLEMENTATION OF INSTITUTIONAL CONSTRAINTS

COMPLIANCE DATE:

December 31, 2002

Submit a technical report acceptable to the Executive Officer documenting that the proposed institutional constraints have been implemented.

4. IMPLEMENTATION OF FINAL REMEDIAL MEASURES

COMPLIANCE DATE:

December 31, 2003

Submit a technical report acceptable to the Executive Officer documenting completion of necessary tasks identified in the Task 1 workplan. The report should document the system startup (as opposed to completion) and should present initial results on system effectiveness.

5. FIVE-YEAR STATUS REPORT

COMPLIANCE DATE:

May 31, 2007

Submit a technical report acceptable to the Executive Officer evaluating the effectiveness of the approved cleanup plan. The report should include:

- a. Summary of effectiveness in controlling contaminant migration and protecting human health and the environment.
- b. Comparison of contaminant concentration trends with cleanup standards.
- c. Comparison of anticipated versus actual costs of cleanup activities.
- d. Performance data (e.g. groundwater volume extracted, chemical mass removed, mass removed per million gallons extracted).
- e. Cost effectiveness data (e.g. cost per pound of contaminant removed).
- f. Summary of additional investigations (including results) and significant modifications to remediation systems.

- g. Additional remedial actions proposed to meet cleanup standards (if applicable) including time schedule.

If cleanup standards have not been met and are not projected to be met within a reasonable time, the report should assess the technical practicability of meeting cleanup standards and may propose an alternative cleanup strategy.

6. PROPOSED CURTAILMENT

COMPLIANCE DATE: 60 days prior to proposed curtailment

Submit a technical report acceptable to the Executive Officer containing a proposal to curtail remediation. Curtailment includes system closure (e.g. well abandonment), system suspension (e.g. cease extraction but wells retained), and significant system modification (e.g. major reduction in extraction rates, closure of individual extraction wells within extraction network). The report should include the rationale for curtailment. Proposals for final closure should demonstrate that cleanup standards have been met, contaminant concentrations are stable, and contaminant migration potential is minimal.

7. IMPLEMENTATION OF CURTAILMENT

COMPLIANCE DATE: 60 days after Executive Officer approval of Task 6 Report

Submit a technical report acceptable to the Executive Officer documenting completion of the tasks identified in Task 6.

8. EVALUATION OF NEW HEALTH CRITERIA

COMPLIANCE DATE: 90 days after request by Executive Officer

Submit a technical report acceptable to the Executive Officer evaluating the effect on the approved cleanup plan of revising one or more cleanup standards in response to revision of drinking water standards, maximum contaminant levels, or other health-based criteria.

9. EVALUATION OF NEW TECHNICAL INFORMATION

COMPLIANCE DATE: 90 days after request by Executive Officer

Submit a technical report acceptable to the Executive Officer evaluating new technical information which bears on the approved cleanup plan and cleanup standards for this site. In the case of a new cleanup technology, the report should evaluate the technology using the same criteria used in the feasibility study. Such technical reports shall not be requested unless the Executive Officer determines that the new information is reasonably likely to warrant a revision in the approved cleanup plan or cleanup standards.

10. REVISED RISK ASSESSMENT

COMPLIANCE DATE: 90 days after request by Executive Officer

Submit a revised risk assessment in the event that ACWD decides to proceed with operation of any water well screened in the Newark Aquifer and located less than 2 miles from the FMC site, including but not limited to the SBP well Site A, Site B, or Site C, as detailed in Finding 13, Groundwater Management.

11. DELAYED COMPLIANCE

If the discharger is delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the discharger shall promptly notify the Executive Officer and the Board may consider revision to this Order.

D. PROVISIONS

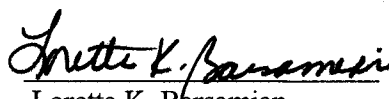
1. **No Nuisance:** The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in California Water Code Section 13050(m).
2. **Good Operation & Maintenance:** The discharger shall maintain in good working order and operate as efficiently as possible any facility or control system installed to achieve compliance with the requirements of this Order.
3. **Cost Recovery:** The discharger shall be liable, pursuant to California Water Code Section 13304, to the Board for all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a State Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the discharger over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program.
4. **Access to Site and Records:** In accordance with California Water Code Section 13267(c), the discharger shall permit the Board or its authorized representative:
 - a. Entry upon premises in which any pollution source exists, or may potentially exist, or in which any required records are kept, which are relevant to this Order.
 - b. Access to copy any records required to be kept under the requirements of this Order.
 - c. Inspection of any monitoring or remediation facilities installed in response to this Order.
 - d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.
5. **Self-Monitoring Program:** The discharger shall comply with the Self-Monitoring Program as attached to this Order and as may be amended by the Executive Officer.
6. **Contractor / Consultant Qualifications:** All technical documents shall be signed by and stamped with the seal of a California registered geologist, a California certified engineering geologist, or a California registered civil engineer.
7. **Lab Qualifications:** All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control (QA/QC) records for Board review. This provision does not apply to analyses that can only reasonably be performed on-site (e.g. temperature).
8. **Document Distribution:** Copies of all correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following agencies:

- a. City of Newark Fire Department (Hazardous Materials Division)
- b. Alameda County Water District (Engineering Department)
- c. Department of Toxic Substances Control (Standardized Permits and Corrective Action Branch)

The Executive Officer may modify this distribution list as needed.

9. **Reporting of Changed Owner or Operator:** The discharger shall file a technical report on any changes in site occupancy or ownership associated with the property described in this Order.
10. **Reporting of Hazardous Substance Release:** If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, the discharger shall report such discharge to the Regional Board by calling (510) 622-2300 during regular office hours (Monday through Friday, 8:00 to 5:00). A written report shall be filed with the Board within five working days. The report shall describe: the nature of the hazardous substance, estimated quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, schedule of corrective actions planned, and persons/agencies notified. This reporting is in addition to reporting to the Office of Emergency Services required pursuant to the Health and Safety Code.
11. **Rescission of Existing Order:** This Order supercedes and rescinds Order No. 98-066.
12. **Periodic SCR Review:** The Board will review this Order periodically and may revise it when necessary. The discharger may request revisions and, upon review, the Executive Officer may recommend that the Board revise these requirements.

I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on May 22, 2002.


Loretta K. Barsamian
Executive Officer

FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO: IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIEF OR CIVIL OR CRIMINAL LIABILITY

Attachments: Self-Monitoring Program
Site Location Map (Figure 1)
Site Plan (Figure 2)
Map Showing Five VOC-Impacted Sites (Figure 3)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM FOR:

FMC CORPORATION
for the property located at
8787 ENTERPRISE DRIVE
NEWARK, ALAMEDA COUNTY

1. **Authority and Purpose:** The Board requests the technical reports required in this Self-Monitoring Program pursuant to Water Code Sections 13267 and 13304. This Self-Monitoring Program is intended to document compliance with Board Order No. 02-060 (Site Cleanup Requirements).
2. **Monitoring:** The discharger shall measure groundwater elevations quarterly in all monitoring wells, and shall collect and analyze representative samples of groundwater according to the following table:

Well #	Sampling Frequency	Analyses	Well #	Sampling Frequency	Analyses
W-1	SA	8015M, 8260	W-30	SA A	8260 Metals
W-2	SA	8015M, 8260	W-31	SA A	8260 Metals
W-3	SA	8015M, 8260	W-32	SA A	8260 Metals
W-4	SA A	8260 Metals	W-34	SA A	8260 Metals
W-6	SA A	8260 Metals	W-35	SA A	8260 Metals
W-7	SA A	8260 Metals	W-37	SA A	8260 Metals
W-8	SA A	8260 Metals	W-40	SA A	8260 Metals
W-10	SA A	8260 Metals	W-44	SA A	8260 Metals
W-12	SA A	8260 Metals	W-48	SA A	8260 Metals
W-13	SA A	8260 Metals	W-54	SA A	8260 Metals
W-19	SA A	8260 Metals	DW-2	SA	8260
W-20	SA A	8260 Metals	DW-3	SA	8260
W-24	SA A	8260 Metals	DW-4	SA	8260
W-27	SA A	8260 Metals	DW-8	SA	8260
W-28	SA A	8260 Metals	DW-11	SA	8260

Key: SA = Semi-Annually

A = Annually

8015M by USEPA Method 8015-Modified or equivalent

8260 by USEPA Method 8260 or equivalent, including EDB

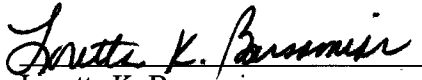
Metals =Arsenic, Barium, Chromium, Nickel, Lead, Selenium by USEPA Series 6000

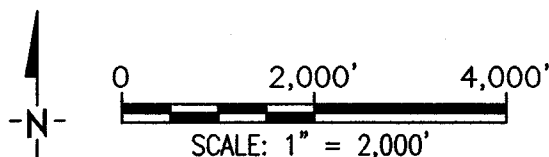
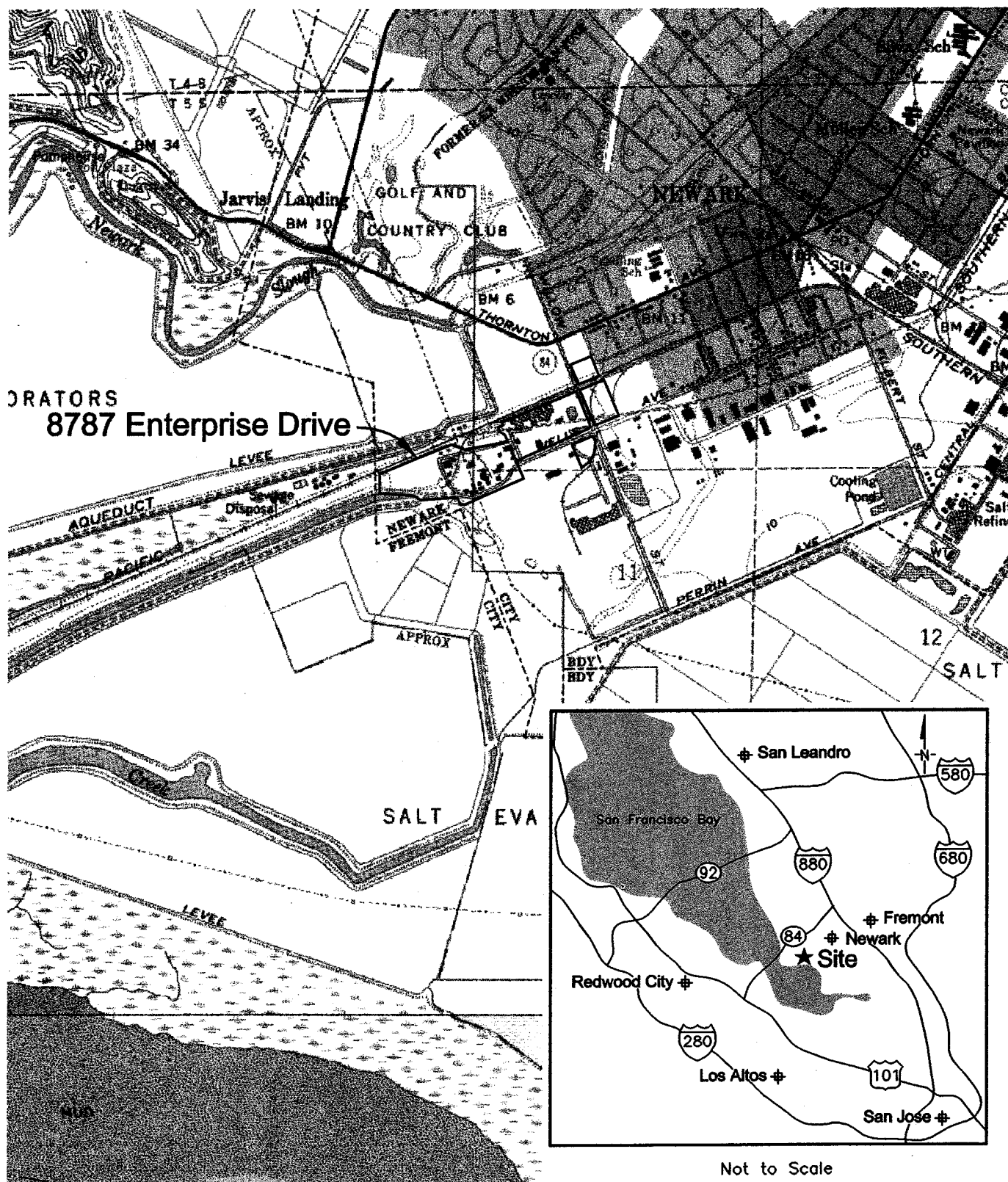
The discharger shall sample any new monitoring or extraction wells or extraction wells quarterly for the first year and semi-annually thereafter and analyze groundwater samples for the same constituents as shown in the above table. The discharger may propose changes in the above table; any proposed changes are subject to Executive Officer approval.

3. **Semi-Annual Monitoring Reports:** The discharger shall submit semi-annual monitoring reports to the Board no later than 30 days following the end of the semi-annual period (e.g. report for July through December period due January 31). The first semi-annual monitoring report shall be due on July 31, 2002. The reports shall include:
 - a. **Transmittal Letter:** The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall be signed by the discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.
 - b. **Groundwater Elevations:** Groundwater elevation data shall be presented in tabular form, and a groundwater elevation map should be prepared for each monitored water-bearing zone. Historical groundwater elevations shall be included in the second semi-annual report each year.
 - c. **Groundwater Analyses:** Groundwater sampling data shall be presented in tabular form, and an isoconcentration map should be prepared for one or more key contaminants for each monitored water-bearing zone, as appropriate. The report shall indicate the analytical method used, detection limits obtained for each reported constituent, and a summary of QA/QC data. Historical groundwater sampling results shall be included in the second semi-annual report each year. The report shall describe any significant increases in contaminant concentrations since the last report, and any measures proposed to address the increases. Supporting data, such as lab data sheets, need not be included (however, see record keeping - below).
 - d. **Groundwater Extraction:** If applicable, the report shall include groundwater extraction results in tabular form, for each extraction well and for the site as a whole, expressed in gallons per minute and total groundwater volume for the period. The report shall also include contaminant removal results, from groundwater extraction wells and from other remediation systems (e.g. soil vapor extraction), expressed in units of chemical mass per day and mass for the period. Historical mass removal results shall be included in the second semi-annual report each year.
 - e. **Status Report:** The semi-annual report shall describe relevant work completed during the reporting period (e.g. site investigation, interim remedial measures) and work planned for the following period.
4. **Violation Reports:** If the discharger violates requirements in the Site Cleanup Requirements, then the discharger shall notify the Board office by telephone as soon as practicable once the discharger has knowledge of the violation. Board staff may, depending on violation severity, require the discharger to submit a separate technical report on the violation within five working days of telephone notification.
5. **Other Reports:** The discharger shall notify the Board in writing prior to any site activities, such as construction or underground tank removal, which have the potential to cause further migration of contaminants or which would provide new opportunities for site investigation.

6. **Record Keeping:** The discharger or his/her agent shall retain data generated for the above reports, including lab results and QA/QC data, for a minimum of six years after origination and shall make them available to the Board upon request.
7. **SMP Revisions:** Revisions to the Self-Monitoring Program may be ordered by the Executive Officer, either on his/her own initiative or at the request of the discharger. Prior to making SMP revisions, the Executive Officer will consider the burden, including costs, of associated self-monitoring reports relative to the benefits to be obtained from these reports.

I, Loretta K. Barsamian, Executive Officer, hereby certify that this Self-Monitoring Program was adopted by the Board on May 22, 2002.


Loretta K. Barsamian
Executive Officer



Salida, California Quadrangle
USGS, 1969 (Rev. 1987) 37121-FI-TF-024

TITLE:

Vicinity Map

LOCATION:

FMC Corporation, 8787 Enterprise Dr, Newark, CA



**HSI
GEOTRANS**
A TETRA TECH COMPANY

CHECKED:	DB
DRAFTED:	GHP
FILE:	Vicinity Map.dwg
DATE:	October 2000

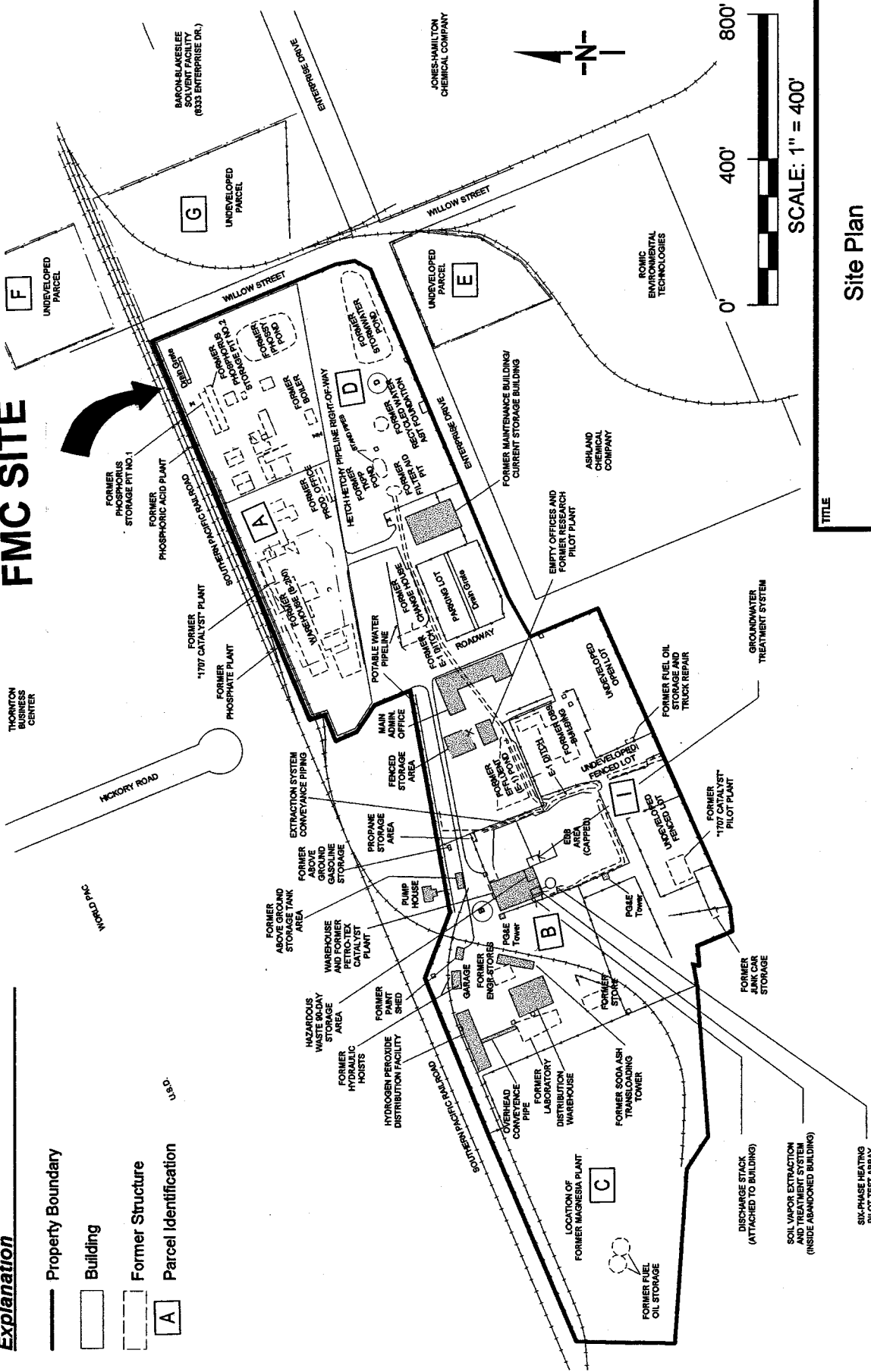
FIGURE:

1

Explanation

- Property Boundary
- Building
- Former Structure
- Parcel Identification

FMC SITE



Site Plan

TITLE LOCATION FMC Corporation, 8787 Enterprise Dr, Newark, CA

	CHECKED BY	DB	FIGURE: 2
	DRAFTED BY	GHP	
	FILE NAME	p388 Features wor	
	DATE	September 20, 2000	

